I. Amendments to the Claims

The listing of claims below will replace all prior versions and listings of claims in the application.

The invention claimed is:

1.   (Currently Amended)   A parametric model-based computer implemented method for customizing ablative surgery, comprising:

~~accessing a parametric model;~~

receiving pre-perturbation data concerning a cornea on which a refractive ophthalmic treatment will be performed;

receiving post-perturbation data concerning the cornea on which the refractive ophthalmic treatment will be performed; ~~and~~

accessing a parametric model that stores one or more correlations between one or more of the pre-perturbation data, the post-perturbation data, and a predicted post-operative result, the correlations being associated with suggested adaptations to ablative algorithms;

selecting an ablative surgical algorithm for use in the surgery based on one or more of the pre-perturbation data and the one or more correlations stored in the parametric model; and

updating ~~an~~the ablative surgical algorithm based~~, at least in part,~~ on one or more ~~correlations in the parametric model, where the correlations are between one or more~~ of the pre-perturbation data~~, the post-perturbation data, and a predicted post-operative result~~and the one or more correlations.

2-6. (Cancelled)

7.   (Currently Amended) The method of claim 1, wherein the pre-perturbation data comprises one or more of topographic data, pachymetric data, elevation data, total corneal thickness data, corneal curvature data, corneal acoustic response and ultrasonic data, wave front data, and intraocular pressure data.

8.   (Original) The method of claim 1, where the post-perturbation data comprises one or more of topographic data, pachymetric data, elevation data, total corneal thickness data, corneal curvature data, corneal acoustic response and ultrasonic data, wave front data, flap thickness data, and intraocular pressure data.

9-10. (Cancelled)

11.   (Currently Amended) A̶The method of claim 1, implemented in a system for updating an ablation surgical algorithm, comprising:

        a data receiver for receiving a corneal data;

        a parametric model stored in the system for storing correlations between the corneal data, a post-operative result and an ablation surgical algorithm update; and

        an ablation algorithm processor for updating a̶n̶the ablation surgical algorithm based, at least in part, on the corneal data and the correlations.

12.   (Currently Amended) The system̶method of claim 11, wherein the corneal data received comprises at least one of corneal acoustic response and ultrasonic data, patient visual acuity and visual performance data, topographic data, pachymetric data, elevation data, total corneal

thickness data, corneal curvature data, wave front data, and intraocular pressure data measured before a cornea is cut.

13.   (Currently Amended) The ~~system~~method of claim 11, where~~in~~ the corneal data received comprises at least one of corneal acoustic response and ultrasonic data, patient visual acuity and visual performance data, topographic data, pachymetric data, elevation data, total corneal thickness data, corneal curvature data, wave front data, and intraocular pressure data measured before a cornea is ablated.

14.   (Currently Amended) The ~~system~~method of claim 11, where~~in~~ the corneal data received comprises at least one of corneal acoustic response and ultrasonic data, patient visual acuity and visual performance data, topographic data, pachymetric data, elevation data, total corneal thickness data, corneal curvature data, wave front data, and intraocular pressure data measured before a cornea is scraped.

15.   (Currently Amended) The ~~system~~method of claim 11, where~~in~~ the corneal data received comprises at least one of corneal acoustic response and ultrasonic data, patient visual acuity and visual performance data, topographic data, pachymetric data, elevation data, total corneal thickness data, corneal curvature data, wave front data, and intraocular pressure data measured before a corneal epithelial layer is peeled.

16.   (Currently Amended) The ~~system~~method of claim 11, where~~in~~ the corneal data received comprises at least one of corneal acoustic response and ultrasonic data, patient visual acuity and visual performance data, patient halo effect and contour sensitivity data, topographic data, pachymetric data, elevation data, total corneal thickness data, corneal curvature data, wave front

data, intraocular pressure data, flap thickness data, and refractive data measured after a cornea is cut.

17.   (Currently Amended) The ~~system~~method of claim 11, where~~in~~ the corneal data received comprises at least one of corneal acoustic response and ultrasonic data, patient visual acuity and visual performance data, patient halo effect and contour sensitivity data, topographic data, pachymetric data, elevation data, total corneal thickness data, corneal curvature data, wave front data, intraocular pressure data, flap thickness data, and refractive data measured after a cornea is ablated.

18.   (Currently Amended) The ~~system~~method of claim 11, where~~in~~ the corneal data received comprises at least one of corneal acoustic response and ultrasonic data, patient visual acuity and visual performance data, patient halo effect and contour sensitivity data, topographic data, pachymetric data, elevation data, total corneal thickness data, corneal curvature data, wave front data, intraocular pressure data, flap thickness data, and refractive data measured after a cornea is scraped.

19.   (Currently Amended) The ~~system~~method of claim 11, where~~in~~ the corneal data received comprises at least one of corneal acoustic response and ultrasonic data, patient visual acuity and visual performance data, patient halo effect and contour sensitivity data, topographic data, pachymetric data, elevation data, total corneal thickness data, corneal curvature data, wave front data, intraocular pressure data, flap thickness data, and refractive data measured after a corneal epithelial layer is peeled.

20-23. (Cancelled)

24. (Currently Amended) ~~A~~The method of claim 1 implemented in a system for updating ~~a~~the parametric ~~ablation~~ model, comprising:

a corneal data receiver that receives at least one of ~~a~~the pre-perturbation data, ~~a~~the post-perturbation data, a post-ablation data, and a patient visual performance data; and

a data integrator that selectively updates the ~~surgical ablation~~ parametric model based, at least in part, on at least one of, the pre-perturbation data, the post-perturbation data, the post-ablation data, and the patient visual performance data.

25. (Currently Amended) The method of claim 1, ~~A corneal ablative surgical method, comprising:~~

wherein the pre-perturbation data comprises~~measuring~~ a first set of corneal measurements, and the post-perturbation data comprises a second set of corneal measurements; and ~~before one or more perturbations~~;

wherein selectively updating of the~~a corneal~~ ablative surgical algorithm is based on the pre-perturbation data~~first set of corneal measurements after the one or more perturbations~~ and one or more first correlations between the ~~first set of corneal measurements~~pre-perturbation data and one or more predicted post-operative results, where the correlations are retrievable from [[a]] the parametric model~~; and~~

~~measuring a second set of corneal measurements after one or more perturbations;~~

~~wherein the method further comprises~~ selectively updating the corneal ablative algorithm based on the second set of corneal measurements~~post-perturbation data~~ and one or more second

~~correlations between the second set of corneal measurements~~post-perturbation data ~~and one or more predicted post-operative results, where the second correlations are retrievable from the parametric model; and~~

~~————ablating corneal tissue from a cornea in accordance with the updated corneal ablative algorithm~~.

26. (Currently Amended) The method of claim 25, wherein ~~measuring~~ the first set of corneal measurements comprises ~~measuring~~ at least one of corneal acoustic response and ultrasonic data, patient visual acuity and visual performance data, topographic data, pachymetric data, elevation data, corneal thickness data, corneal curvature data, wave front data, intraocular pressure data, peripheral stroma thickness data, an age datum, a sex datum, contact lens use data, and prior surgical response data by at least one of corneal topography, optical coherence tomography, wave front analysis, ultrasound, and patient interview.

27. (Currently Amended) The method of claim 25, wherein ~~measuring~~ the second set of corneal measurements comprises ~~measuring~~ at least one of corneal acoustic response and ultrasonic data, patient visual acuity and visual performance data, topographic data, pachymetric data, elevation data, corneal thickness data, corneal curvature data, wave front data, intraocular pressure data, peripheral stroma thickness data, an age datum, a sex datum, contact lens use data, and prior surgical response data by at least one of corneal topography, optical coherence tomography, wave front analysis, ultrasound, and patient interview.

28-29. (Cancelled)

30. (Currently Amended) ~~A computer readable medium having stored thereon a data structure employed in updating a corneal ablative algorithm~~The method of claim 1, comprising:

holding the pre-perturbation data in a first field of a data structure of a computer readable medium for updating the ablative surgical algorithm~~that holds information concerning one or more pre-operative corneal measurements~~;

holding the predicted post-operative result in a second field of the data structure~~that holds information concerning one or more predicted post-operative results~~, where the predicted post-operative results are derived from the one or more pre-operative corneal measurements via one or more correlations stored in [[a]]the parametric model; and

holding information concerning one or more updates to the ablative surgical algorithm in a third field of the data structure,~~that holds information concerning one or more updates to an ablative algorithm~~ where the updates are derived from the pre-operative corneal measurements, the predicted post-operative results and the correlations.

31. (Currently Amended) The method of claim 30~~The computer readable medium of claim 29~~, comprising:

holding the post-perturbation data in a fourth field of the data structure; ~~that holds information concerning one or more corneal measurements taken after one or more perturbation;~~ and

wherein the information stored in the third field is derived from the ~~pre-operative corneal measurements~~pre-perturbation data, the post-perturbation data corneal measurements taken during a corneal ablative procedure, the predicted post-operative results, and the correlations.

32. (Currently Amended) ~~A~~The method of claim 1 implemented in a set of application programming interfaces embodied on a computer readable medium for execution by a computer component ~~in conjunction with updating an ablative algorithm,~~the set of application programming interfaces comprising:

a first interface for communicating a corneal measurement data;

a second interface for communicating a correlation data; and

a third interface for communicating an ablative algorithm updating data derived from the corneal measurement data and the correlation data.

33. (Cancelled)

34. (Currently Amended) ~~A~~The method of claim 1 implemented in a computer data signal embodied in a transmission medium, comprising:

a first set of instructions for receiving corneal measurements;

a second set of instructions for ~~identifying a~~selecting an ablative algorithm based upon one or more correlations between ~~a~~ the corneal measurements and a predicted post-operative result, the correlations being stored in a parametric model and associated with suggested adaptations to the ablative algorithm; and

a third set of instructions for updating ~~an~~ the ablative algorithm based on the corneal

measurements and/~~or~~ the one or more correlations~~predicted post-operative result~~.

35-37. (Cancelled)

38. (Currently Amended) ~~A laser eye surgery apparatus for performing a customized laser ablation of corneal tissue~~The method of claim 1, comprising:

~~a laser for ablating corneal tissue that produces a predicted post-operative result;~~

storing in a memory of a laser eye surgery apparatus~~for storing~~ an ablation program that controls ~~the~~a laser of the apparatus for ablating corneal tissue;

storing in the ~~a~~memory ~~for storing~~ a corneal measurement data;

storing in the ~~a~~ memory ~~for storing a~~the parametric model that stores a correlation between the corneal measurement data and the predicted post-operative result; and

adapting with a processor of the apparatus~~for adapting~~ the ablation program based on the correlation.

39. (Currently Amended) ~~A~~The method of claim 1 implemented in a laser eye surgery apparatus ~~for performing a customized laser ablation of corneal tissue~~, comprising:

a laser for ablating corneal tissue that produces a predicted post-operative result;

a computer component for receiving an ablation program updated as a result of a correlation between a corneal measurement and the predicted post-operative result; and

a memory for storing the updated ablation program.

40. (New) A computer readable medium storing computer executable instructions operable to perform computer executable portions of the method of claim 1.

41. (New) A system for updating an ablation algorithm for customizing ablative surgery, comprising:

a data receiver for receiving pre-perturbation data and post-perturbation data concerning a cornea on which a refractive ophthalmic treatment will be performed;

a parametric model for storing correlations between one or more of the pre-perturbation data, the post-perturbation data, and a predicted post-operative result, the correlations being associated with suggested adaptations to ablative algorithms; and

an ablation algorithm processor for (i) selecting an ablative algorithm for use in the surgery based on one or more of the correlations stored in the parametric model and (ii) updating the ablation algorithm based on one or more of the pre-perturbation data and the one or more correlations.

42. (New) The system of claim 41, wherein the corneal data comprises at least one of corneal acoustic response and ultrasonic data, patient visual acuity and visual performance data, topographic data, pachymetric data, elevation data, total corneal thickness data, corneal curvature data, wave front data, and intraocular pressure data measured before a cornea is cut.

43. (New) The system of claim 41, wherein the corneal data comprises at least one of corneal acoustic response and ultrasonic data, patient visual acuity and visual performance data,

topographic data, pachymetric data, elevation data, total corneal thickness data, corneal curvature data, wave front data, and intraocular pressure data measured before a cornea is ablated.

44. (New) The system of claim 41, wherein the corneal data comprises at least one of corneal acoustic response and ultrasonic data, patient visual acuity and visual performance data, topographic data, pachymetric data, elevation data, total corneal thickness data, corneal curvature data, wave front data, and intraocular pressure data measured before a cornea is scraped.

45. (New) The system of claim 41, wherein the corneal data comprises at least one of corneal acoustic response and ultrasonic data, patient visual acuity and visual performance data, topographic data, pachymetric data, elevation data, total corneal thickness data, corneal curvature data, wave front data, and intraocular pressure data measured before a corneal epithelial layer is peeled.

46. (New) The system of claim 41, wherein the corneal data comprises at least one of corneal acoustic response and ultrasonic data, patient visual acuity and visual performance data, patient halo effect and contour sensitivity data, topographic data, pachymetric data, elevation data, total corneal thickness data, corneal curvature data, wave front data, intraocular pressure data, flap thickness data, and refractive data measured after a cornea is cut.

46. (New) The system of claim 41, wherein the corneal data comprises at least one of corneal acoustic response and ultrasonic data, patient visual acuity and visual performance data, patient halo effect and contour sensitivity data, topographic data, pachymetric data, elevation data, total corneal thickness data, corneal curvature data, wave front data, intraocular pressure data, flap thickness data, and refractive data measured after a cornea is ablated.

47. (New) The system of claim 41, wherein the corneal data comprises at least one of corneal acoustic response and ultrasonic data, patient visual acuity and visual performance data, patient halo effect and contour sensitivity data, topographic data, pachymetric data, elevation data, total corneal thickness data, corneal curvature data, wave front data, intraocular pressure data, flap thickness data, and refractive data measured after a cornea is scraped.

48. (New) The system of claim 41, wherein the corneal data comprises at least one of corneal acoustic response and ultrasonic data, patient visual acuity and visual performance data, patient halo effect and contour sensitivity data, topographic data, pachymetric data, elevation data, total corneal thickness data, corneal curvature data, wave front data, intraocular pressure data, flap thickness data, and refractive data measured after a corneal epithelial layer is peeled.

49. (New) A computer readable medium storing computer executable components of the system of claim 41.

51. (New) The method of claim 1, comprising ablating corneal tissue from a cornea in accordance with the updated corneal ablative algorithm.

52. (New) The method of claim 25, comprising selectively updating the corneal ablative algorithm based on the post-perturbation data and one or more second correlations between the post-perturbation data and one or more predicted post-operative results, where the second correlations are retrievable from the parametric model; and

ablating corneal tissue from a cornea in accordance with the updated corneal ablative algorithm.